

SED CABid: ES1909	Test Report No:
ab. Company Number: 4621A	72449RRF.005A1
Test Report USA FCC Part 15.225, 1 CANADA RSS-210, RSS	
(*) Identification of item tested	XS4 Original+ Electronic Lock Series including all mechanical variants
(*) Trademark	SALTO
(*) Model and/or type reference	W41M (Type reference: E2131)
Other identification of the product	FCC ID: UKCW41M IC ID: 10088A-W41M
(*) Features	Features: Bluetooth LE HW version: 1.0 SW version: 0174 (Control FW), 0186 (FUS FW) 0187 (BLE FW), 0202 (Motor FW)
Applicant	SALTO SYSTEMS, S.L. Arkotz 9, Polígono Lanbarren 20180, Oiartzun, Gipuzkoa, SPAIN
Test method requested, standard	USA FCC Part 15.225 (10-1-21 Edition): Operation within the band 13.110 -14.010. USA FCC Part 15.209 (10-1-21 Edition): Radiated emissio limits, general requirements. CANADA RSS-210 Issue 10 (December 2019). CANADA RSS-Gen Issue 5 (March 2019). ANSI C63.10-2013: American National Standard for Testin Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager
Date of issue	2023-05-18
Report template No	FDT08_24 (*) "Data pr ovided by the client"





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Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that covers the performed tests in this report.

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In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification at the time of performance of the test.

DEKRA Testing and Certification is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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General conditions

- 1. This report is only referred to the item that has undergone the test.
- 2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
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- 4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Testing and Certification internal document PODT000.

The total uncertainty of the measurement system for the radiated emissions of EUT from 9 kHz to 30 MHz is: Measurement uncertainty $\leq \pm 3.08$ dB (with factor k = 2).

The total uncertainty of the measurement system for the radiated emissions of EUT from 30 MHz to 200 MHz is: Measurement uncertainty $\leq \pm 5.35$ dB (with factor k = 2).

The total uncertainty of the measurement system for the conducted testing of EUT is: Frequency Tolerance of the Carrier Signal: Measurement uncertainty ≤ ± 12.3 kHz Occupied Bandwidth ≤ ± 1.70 kHz Field strength of emissions within the band ≤ ± 3.44 dB



Data provided by the client

The following data has been provided by the client:

- 1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
- 2. The sample consists of a XS4 Original+ Electronic Lock Series with RFID Mifare (ISO14443A & ISO15693 standard based) and Bluetooth LE technology.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: The client.

ld	Control Number	Description	Model	Serial Nº	Date of Reception	Application	
S/01	72449_17.1	XS4 Original+ Electronic Lock	W41M		2022-10-21	Element Under Test	
S/02	72449_8.1	XS4 Original+ Electronic Lock	W41M		2022-10-21	Element Under Test	
S/02	66344B_27.1	Battery holder			2021-09-20	Auxiliary Element	

Notes referenced to samples during the project:

ld	Туре
S/01	Sample used for radiated test
S/02	Sample used for conducted test



Test sample description

Ports:	Port name and description		Cable							
			Specified max length [m]	Attached during test		Shielde	hielded		Coupled to patient ⁽³⁾	
				[]		[]	[]		[]	
Supplementary information to the ports:			-	-						
Rated power supply :	Voltage and Frequency									
		, , ,		L1	L2	L3		N	PE	
	[]	AC:		[]	[]	[]	[]	[]	
	[X]	DC: 4.5 Vdc (3 x L	R03 batteries)						
Rated Power :										
Clock frequencies:	27.12	MHz, 32 MHz, 32.7	68 KHz							
Other parameters:	N/A									
Software version:	0174 (Control FW) + 0186 (FUS FW) + 0187 (BLE FW) + 0202 (Motor FW)									
Hardware version:	1.0									
Dimensions in cm (W x H x D) :	4.0 x 28.2 x 2.0 cm									
Mounting position:	[] Table top equipment									
	[] Wall/Ceiling mounted equipment									
	[]	Floor standing equ	uipment							
	[]	Hand-held equipm	ient							
	[X]	Other: Door moun	ting							
Modules/parts:	Modu	le/parts of test item			Ту	pe	Ma	nufact	turer	
	SoC + Antenna BLE ST		ST + JOHANSON							
Accessories (not part of the test item)	Description Type Manufacturer			er						
Documents as provided by the applicant	Description File name Issue date			date						
appilodi It	User manual									
	FW Explanation									

⁽³⁾ Only for Medical Equipment



Identification of the client

SALTO SYSTEMS, S.L. Arkotz 9, Polígono Lanbarren 20180, Oiartzun, Gipuzkoa, SPAIN

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.	
Date (start)	2022-09-11	
Date (finish)	2022-12-17	

Document history

Report number	Date	Description		
72449RRF005	2023-02-21	First release.		
72449RRF005A1	2023-05-18	Test report is modified due to missing info. This modification test report cancels and replaces the test report 72449RRF.005.		

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %



Remarks and comments

The tests have been performed by the technical personnel: Pablo Redondo, Miguel Manuel Lopez and Francisco Javier Fernandez.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
6791	SEMIANECHOIC ABSORBER LINED CHAMBER	FACT 3 200 STP	ETS LINDGREN	N/A
6792	SHIELDED ROOM	S101	ETS LINDGREN	N/A
0242	ACTIVE LOOP ANTENNA 9 KHZ-30 MHz	11966A	HEWLETT PACKARD	2024-08-18
6143	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2023-10-29
6142	PRE-AMPLIFIER G>38dB 30MHz-6GHz	BLNA 0360-01N	BONN ELEKTRONIK	2023-06-16
6165	EMI TEST RECEIVER 9kHz- 7GHz	ESR7	ROHDE AND SCHWARZ	2023-11-08
7817	EMI TEST RECEIVER 2Hz- 44GHz	ESW44	ROHDE AND SCHWARZ	2023-12-30
0922	DC POWER SUPPLY 40V/40A	NGPE 40/40	ROHDE AND SCHWARZ	N/A
7760	DIGITAL MULTIMETER	175	FLUKE	2023-11-14
8002	TEMPERATURE CHAMBER	MK 56	BINDER	2023-03-22
7794	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2023-02-26



Testing verdicts

Fail	F
Inconclusive	1
Not applicable	N/A
Not measured	N/M
Pass	Р

Summary

FCC PART 15 PARAGRAPH / RSS-210						
Requirement – Test case	Verdict	Remark				
FCC 15.225 (a) / RSS-210 B.6 (a)(i) Field strength of emissions within the band 13.553 MHz -13.567 MHz	Р					
FCC 15.225 (b) / RSS-210 B.6 (a)(ii) Field strength of emissions within the band 13.410 - 13.553 MHz and 13.567 – 13.710 MHz	Р					
FCC 15.225 (c) / RSS-210 B.6 (a)(iii) Field strength of emissions within the band 13.110 - 13.410 MHz and 13.710 – 14.010 MHz	Р					
FCC 15.225 (d) / RSS-210 B.6 (a)(iv) Field strength of emissions outside of the band 13.110 MHz -14.010 MHz	Р					
FCC 15.225 (e) / RSS-210 B.6 (b) Frequency tolerance of the carrier signal	Р					
Supplementary information and remarks: None.						



Appendix A: Test results



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FCC 15.225 (d) / RSS-210 B.6 (a)(iv) Field Strength of Emissions outside of the band 13.110 MHz -	
FCC 15.225 (e) / RSS-210 B.6 (b) Frequency Tolerance of the Carrier Signal	30



TEST CONDITIONS

(*) Data provided by the Applicant.

POWER SUPPLY (*):

Vnominal:	4.5Vdc
Vminimum:	3.825Vdc
Vmaximum:	4.95Vdc
Type of Power Supply:	3 x LR03 batteries

ANTENNA (*):

Type of Antenna:	Integral, PCB.
Maximum Declared Antenna Gain:	N/A

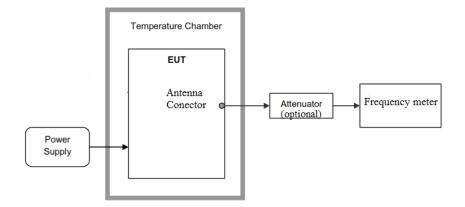
TEST FREQUENCY (*):

Nominal Operating Frequency: 13.56 MHz

CONDUCTED MEASUREMENTS:

The equipment under test was set up in a shielded room and it is directly connected to the spectrum analyzer.

For frequency stability test the EUT was placed inside a climatic chamber and connected to a frequency meter using a low loss cable. An external DC power supply was connected to the EUT for voltage variation test.





RADIATED MEASUREMENTS:

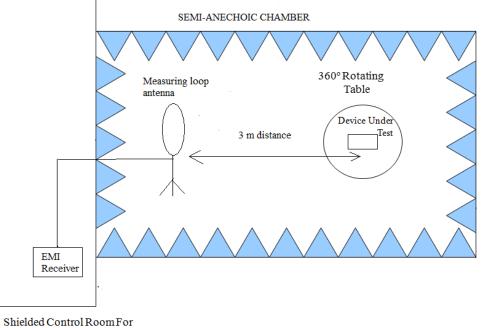
All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Loop antenna for the range between 9 kHz to 30 MHz and Bilog antenna for the range between 30 MHz to 200 MHz) is situated at a distance of 3 m.

For radiated emissions in the range 9 kHz to 30 MHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 40 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and in the range between 30 MHz and 200 MHz the antenna height was varied from 1 to 4 meters to find the maximum radiated emission. In the range between 9 kHz and 30 MHz the measurements were made in the three different orientation planes of the loop antenna to determine the maximum received field.

In the range between 30 MHz and 200 MHz the measurements were made in both horizontal and vertical planes of polarization.

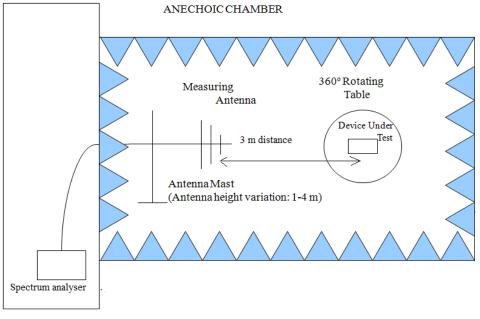
Radiated measurements setup 9 kHz to 30 MHz:



Radiated Measurements



Radiated measurements setup 30 MHz to 200 MHz:



Shielded Control Room For Radiated Measurements



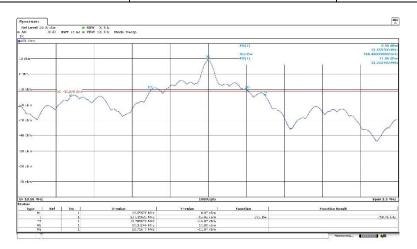
Occupied Bandwidth

RESULTS:

99 % Occupied Bandwidth and 20 dB Bandwidth.

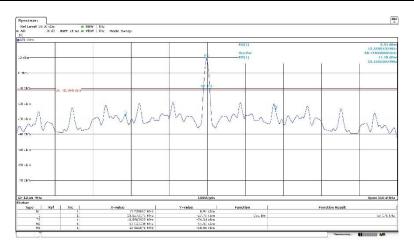
• RFID mode ISO 14443A:

Operation mode	99% Occupied Bandwidth (kHz)	20 dB Bandwidth (kHz)		
RFID 13.56 MHz mode ISO 14443A	768.45	383.98		



• RFID mode ISO 15693:

Operation mode	99% Occupied Bandwidth (kHz)	20 dB Bandwidth (kHz)		
RFID 13.56 MHz mode ISO 15693	59.18	2.54		





FCC 15.225 (a) / RSS-210 B.6 (a). Field strength of emissions within the band 13.553 -13.567 MHz

SPECIFICATION:

The field strength of any emissions within the band 13.553 - 13.567 MHz shall not exceed 15,848 microvolts/meter (84 dBµV/m) at 30 meters.

RESULTS:

Measurement distance: 3 meters.

• RFID mode ISO 14443A:

The maximum field strength of fundamental emission:

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.561	53.80	13.80

ultiView Receive	or						
Meas BW (OPK) 9 kHz	Meas Time 100 ms						
Att 0 dB Input 1 DC	Preamp Off St PS On No	ep LIN				Frequency 1	3.5670000 M
Finputi "0242_Antenna_Fi Scan	ield_9KHz-30MHz_08-2022"						
scan						M1	ο 1QP Cl [1] 53.80 dBμV
D dBµV/m	124.000 dBµ∀/m						13.561000 M
(dbp 1) 11							
dBµV/m							
I dBµV/m							
- august m							
dBµV/m							+
dBµV/m							
ubp 4/11							
dBµ∨/m							
dBµ∀/m							
oop m			_	M1			
dBµ∀/m						 	
dBpV/m							
apprym							
dBµV/m							+
dBµV/m							
apprym							
dBµV/m							+
					1	1	

The limit shown in the above plot is extrapolated to 3 meters



The maximum field strength of fundamental emission:

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.561	54.39	14.39

Receiver	Spectrum 🛞						
Input 1 DC 👄	RBW (QPK) 9 kHz MT Att 0 dB Pream		_MAYO2021\9kHz_30MHz_Efeil	d_3m_Ant0242.TDF ALC4_M	AYO2021\CABLE_7645_3m.TD	F ALC4_MAYO2021\CABLE_6	
Scan @1QP1		o orr atep Lin					
				M1[1] 0.000 s		5	4.39 dBµV/m 3.561000 MHz
				0.000 3			
120 dBµV/m—							
110 dBµV/m							·
110 00000							
100 dBµV/m							
90 dBµV/m							
80 dBµV/m							
70 dBµV/m							
60 dBµV/m							
				M1			
50 dBµV/m							
40 dBµV/m-							
40 ασμν/m							
30 dBµV/m							
20 dBµV/m							
10 dBµV/m							
01 1 10 5							TF
Start 13.553	MHz					Stop	13.567 MHz

The limit shown in the above plot is extrapolated to 3 meters



FCC 15.225 (b) / RSS-210 B.6 (b). Field strength of emissions within the band 13.410 - 13.553 MHz and 13.567 - 13.710 MHz

SPECIFICATION:

Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter ($50.47 \text{ dB}\mu\text{V/m}$) at 30 meters.

RESULTS:

Measurement distance: 3 meters.

- Band 13.410 - 13.553 MHz

• RFID mode ISO 14443A:

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.553	39.28	-0.72

							
	Receiver						•
Meas BW (QPK Att Input	() 9 kHz Meas Time 0 dB Preamp 1 DC PS	e 100 ms Off Step LI On Notch O	N			Frequency 13	8.5530000 MHz
TDF Input1 "0242_Ar 2 Scan	ntenna_Field_9KHz-30	MHz_08-2022"					• 1QP Clrw
120 dBµV/m						M1	 [1] 39.28 dBμV/m 13.553000 MHz
110 dBµV/m							
100 dBµV/m							
190 dBpV/m	H1 90.470 dBuV/m						
80 dBµV/m							
70 dBµV/m							
60 dBµ∀/m							
50 dBµ∀/m							
40 dBµV/m							M1
30 dBµV/m			\sim		 		/
20 dBµV/m				 		~	
10 dBµV/m							
Start 13.41 MHz							TF Stop 13.553 MHz
7.631 C 101 11 (0112							0.00 10/000 10/12

The limit shown in the above plot is extrapolated to 3 meters



Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.553	40.06	0.06

Receiver	Spectrum 🗴					
Input 1 DC	RBW (CISPR) 9 kHz MT Att 0 dB Prea	.C4_MAYO2021\9kHz_30MHz_I	Efeild_3m_Ant0242.TDF ALC4	4_MAYO2021\CABLE_7645_3	m.TDF ALC4_MAYO2021\CAE	3LE_6710_11m.TDF
Scan 😁1QF						
			M1[1] 0.000 s			40.06 dBµV/m 13.553000 MHz
120 dBµV/m-	0	2		2		
110 dBµV/m—						
100 dBµV/m-						
-90 dBpV/m	D1 90.470 dBµV/m-					
80 dBµV/m—						
70 dBµV/m—						
60 dBµV/m—						
50 dBµV/m—						
40 dBµV/m—						M
30 dBµV/m—						
30 ubpv/m				~ /		
20 dBµV/m—						
10 dBµV/m—						
Start 13.41	MHz				l s	TF top 13.553 MHz

The limit shown in the above plot is extrapolated to 3 meters



- Band 13.567-13.710 MHz

• RFID mode ISO 14443A:

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.567	39.53	-0.47

							<
MultiView							•
 Att Input 	PK) 9 kHz Meas Tim 0 dB Preamp 1 DC PS	Off Step LI On Notch O	N			Frequency 13	3.7100000 MHz
TDF Input1 "0242_ 2 Scan	_Antenna_Field_9KHz-30	MHz_08-2022"					0 1QP Clrw
						M1	[1] 39.53 dBµV/m
120 dBµV/m					 		13.567000 MHz
110 dBµV/m							
100 dBµV/m							
90 dBµV/m	H1 90.470 dBuV/m						
90 dbp4/m							
80 dBµV/m							
70 dBµ∀/m							
60 dBµV/m							
00 dbp1//m							
50 dBµV/m							
M1 (40 dBµV/m−−−−−							
\land							
30 dBµV/m							
20 dBµV/m				\sim			
	7						
10 dBµV/m							
							TF
Start 13.567 MH	lz						Stop 13.71 MHz

The limit shown in the above plot is extrapolated to 3 meters



Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.567	40.21	0.21

Receiver	Spectrum 🛞						
R Input 1 DC 👄 A			MAYO2021\9kHz_30MHz_Efeil	d_3m_Ant0242.TDF ALC4_M	AYO2021\CABLE_7645_3m.T	DF ALC4_MAYO2021\CABLE_	6710_11m.TDF
Scan O1QP CI		OFF Step LIN					
				M1[1]		4	0.21 dBµV/m
				0.000 s	1	13	.567000 MHz
120 dBµV/m	-			/			
110 dBµV/m							
100 dBµV/m							
	D4 00 470 /D 1//						
90 dBpV/m	——D1 90.470 dBµV/m—						
80 dBµV/m							
70 dBµV/m							
60 dBµV/m							
50 dBµV/m							
1							
40 dBµV/m							
30 dBµV/m							
20 dBµV/m							
						~	\sim
10 dBµV/m							
04 and 10 567 1							TF
Start 13.567 N	IHZ					Sto	p 13.71 MHz

The limit shown in the above plot is extrapolated to 3 meters



FCC 15.225 (c) / RSS-210 B.6 (c). Field strength of emissions within the band 13.110 - 13.410 MHz and 13.710 - 14.010 MHz

SPECIFICATION:

Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz, the field strength of any emissions shall not exceed 106 microvolts/meter ($40.51 \text{ dB}\mu \text{V/m}$) at 30 meters.

RESULTS:

Measurement distance: 3 meters.

- Band 13.110-13.410 MHz

• RFID mode ISO 14443A:

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.350	30.84	-9.16

MultiView	Receiver						
Meas BW (QPK	() 9 kHz Meas Time	e 100 ms					
 Att Input 	0 dB Preamp 1 DC PS	Off Step LI On Notch O	N ff			Frequency 13	3.4100000 MHz
TDF Input1 "0242_A	ntenna_Field_9KHz-30	MHz_08-2022"					o 1QP Clrw
2.50011						M1	[1] 30.84 dBµV/m
120 dBµV/m							13.350000 MHz
110 dBµV/m							
100 dBµV/m							
90 dBµ∀/m							
90 08µV/m							
80 dBµV/m	H1 80.510 dBµV/m				 		
70 dBµV/m							
60 dBµV/m							
50 dBµV/m							
10 10 11/1							
40 dBµV/m					M	1	
30 dBµV/m					<u> </u>	<u> </u>	\sim
20 dBµV/m				 		\mathbf{X}	~
	X						~
10 dBµV/m-							
Ctout 12 11 MU-							Ctop 12 41 MU
Start 13.11 MHz							Stop 13.41 MHz

The limit shown in the above plot is extrapolated to 3 meters



Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.402	16.52	-23.48

	ctrum 🛞				
Input 1 DC 👄 Att	SPR)9 kHz MT 100 ms 0 dB Preamp OFF Ste		/IHz_Efeild_3m_Ant0242.TDF ALC4	I_MAYO2021\CABLE_7645_3m.TDF	ALC4_MAYO2021\CABLE_6710_11m.TDF
Scan 😝1QP Clrw					
			M1[1] 0.000 s		16.52 dBµ∀/m 13.402000 MHz
120 dBµV/m					
110 dBµV/m					
100 dBµV/m					
100 00000					
90 dBµV/m					
80 dBpV/mD1 8	 30.510 dBµV/m=				
70 dBµV/m					
60 dBµV/m					
60 UBHV/m-					
50 dBµV/m					
40 dBµV/m		-			
30 dBµV/m					
20 dBµV/m					
10 dBµV/m-					
Start 13.11 MHz					TF Stop 13.41 MHz

The limit shown in the above plot is extrapolated to 3 meters



- Band 13.710-14.010 MHz

• RFID mode ISO 14443A:

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.770	30.35	-9.65

								
MultiView	Receiver							•
Att Input TDF Input1 "0242_A	() 9 kHz Meas Time 100 0 dB Preamp 1 DC PS Intenna_Field_9KHz-30MHz	Off Step Lif On Notch O	N ff				Frequency 14	.0100000 MHz
2 Scan				[M1	0 1QP Clnw [1] 30.35 dBµV/m
120 dBµV/m							MI	13.770000 MHz
110 dBµV/m								
100 dBµV/m								
90 dBµV/m								
-80-dBµ∀/m	H1_80.510_dBµV/m							
70 dBµV/m								
60 dBµV/m								
50 dBµV/m								
40 dBµV/m								
30.dBµV/m	M1							
20 dBµV/m-			\sim					_
			\sim					′ \
10 dBµV/m								
Start 13.71 MHz				1	1	1		Stop 14.01 MHz

The limit shown in the above plot is extrapolated to 3 meters



Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.718	16.50	-23.50

Receiver	Spectrum 🛞				
Input 1 DC 👄	RBW (CISPR) 9 kHz MT 100 ms Att 0 dB Preamp OFF \$	ALC4_MAYO2021\9kHz_30 Step LIN	MHz_Efeild_3m_Ant0242.TDF ALC4	MAYO2021\CABLE_7645_3m.TDF	ALC4_MAYO2021\CABLE_6710_11m.TC
Scan 😑 1QP (
			M1[1] 0.000 s		16.50 dBμV/r 13.718000 MH
120 dBµV/m				7	
110 dBµV/m—					
100 dBµV/m					
90 dBµV/m					
90 dBuly/m	D1 80.510 dBµV/m				
00 dbp v/m					
70 dBµV/m					
60 dBµV/m					
50 dBµV/m					
finite surrouters					
40 dBµV/m					
30 dBµV/m					
20 dBuV/m					
10 dBµV/m-			·		
Start 13.71 M	MHz				Stop 14.01 MHz

The limit shown in the above plot is extrapolated to 3 meters



FCC 15.225 (d) / RSS-210 B.6 (a)(iv) Field Strength of Emissions outside of the band 13.110 MHz - 14.010 MHz

SPECIFICATION:

Field strength of any emissions appearing outside of the band 13.110 MHz - 14.010 MHz band shall not exceed the general radiated emission limits in 15.209/RSS-Gen:

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	29.54	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

RESULTS:

All tests were performed in a semi-anechoic chamber at a distance of 3 m.

The spectrum was inspected from 9 kHz to 200 MHz searching for spurious signals.

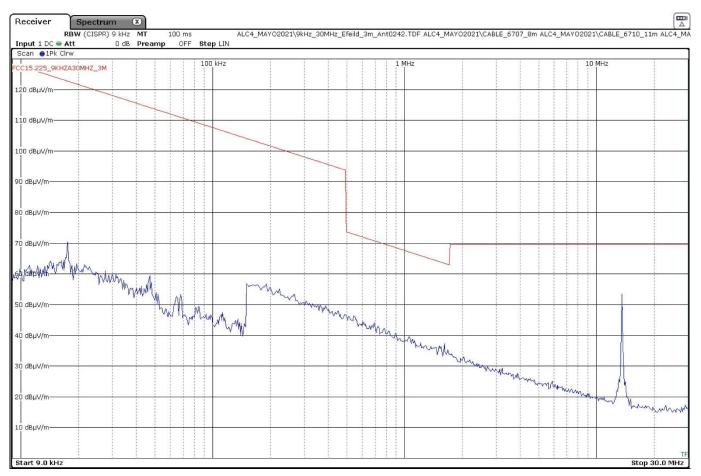
The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifier gain.



- Frequency range 9 kHz - 30 MHz:

• RFID mode ISO 14443A:

No spurious frequencies were found at less than 20 dB of the limit.

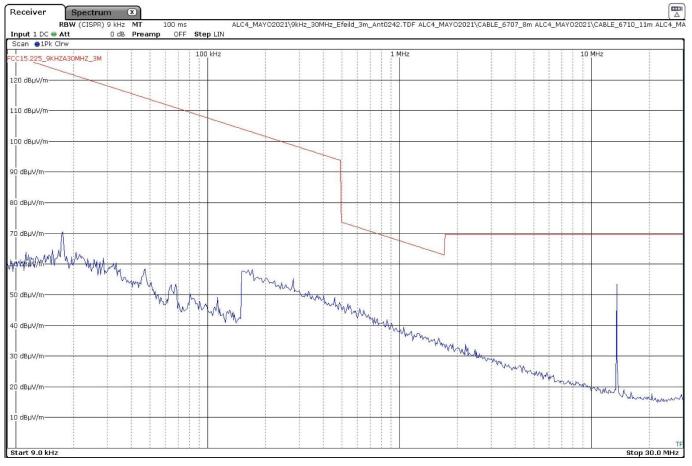


The limits shown in the above plot are extrapolated to 3 meters. The highest peak corresponds to the carrier level.

Resolution bandwidth: 200 Hz for 9 kHz \leq f \leq 150 kHz 9 kHz for 150 kHz \leq f \leq 30 MHz DEKRA Testing and Certification, S.A.U. Parque Tecnológico de Andalucía, c/ Severo Ochoa nº 2 · 29590 Campanillas · Málaga · España C.I.F. A29507456



• RFID mode ISO 15693:



No spurious frequencies were found at less than 20 dB of the limit.

The limits shown in the above plot are extrapolated to 3 meters. The highest peak corresponds to the carrier level.

Resolution bandwidth: 200 Hz for 9 kHz \leq f \leq 150 kHz 9 kHz for 150 kHz \leq f \leq 30 MHz



- Frequency range 30 - 200 MHz:

• RFID mode ISO 14443A:

No spurious frequencies were found at less than 20 dB of the limit.

									(*)
MultiView = I	Receiver ×	Spectrum	×						•
Ref Level 70.00 d Att Input TDE Input2 "ANTENA	OdB SWT 30 ms	RBW 100 kHz VBW 300 kHz Notch Off 6021"."AMPLIFICADO	Mode Sweep)7 8M"."CABLE 9122	3M"."CABLE 9213 2	2M"."CABLE 9110 1M	μ	Frequency 115	5.0000000 MHz
1 Frequency Swee									o1Pk View
Limit Check Line FCC15			P P	ASS ASS					
60 dBµV/m									
50 dBµV/m									
-40-d8µV/m									
FCC15									
30 dBµV/m									
20 dBµV/m									
10 depairie					at the second second	and a share to be	a fan te er fan te fan ser fan te fan de fan de fan ser fan se General of general general general ser fan ser f	and a second second second from the	a anna an tar tha tha an tar an ta
	a start we were a direct	for hand a list life bet bline a friedra de	in a start of the second second	and which is delivery of the state of			and the state of t	and a second from a single production of the second second	A free include integration, management (brow
O dBµV/m−−−−	an a	and the second sec							
-10 dBµV/m									
-20 dBµV/m									
30.0 MHz			30000 pts	5		 17.0 MHz/			200.0 MHz

The above plot shows the results of the scan using peak detector.

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• RFID mode ISO 15693:

No spurious frequencies were found at less than 20 dB of the limit.

									
MultiView	Receiver ×	Spectrum	×						•
Ref Level 70.00	OdB SWT 30 ms	 RBW 100 kHz VBW 300 kHz Notch Off 	Mode Sweep					Frequency 11!	5.0000000 MHz
Input TDF Input2 "ANTENA 1 Frequency Swee	_6143_AF","ATT_3DB_	Notch Off _6021","AMPLIFICADO	R_6142","CABLE_67	07_8M","CABLE_9122	_3M","CABLE_9213_2	2M","CABLE_9110_1M	n.		o 1Pk View
Limit Check			P	ASS					O IPK VIEW
Line FCC15				ASS					
60 dBµV/m									
00 00000000									
50 dBµV/m									
40-dBµV/m									
FCC15									
30 dBµV/m									
20 dBµV/m									
Manual .									
10 SEPTIME				an ana kasa a sa babbaar	an and all a standard of	فأني اللافا ويدوعا وروريا وراوتك ووا			
The Date of the Association	المصرية المقاطرين وبالطاطرين	delegente di tra de parti de la contra de la c				and which there are a state of the street bird and	discussion of the fit		
0 dBµV/m									
-10 dBµV/m									
-20 dBµV/m									
30.0 MHz			30000 pt	5		17.0 MHz/			200.0 MHz

The above plot shows the results of the scan using peak detector.



FCC 15.225 (e) / RSS-210 B.6 (b) Frequency Tolerance of the Carrier Signal

SPECIFICATION:

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

RESULTS:

Nominal Operating Frequency: 13.56 MHz.

• RFID mode ISO 14443A:

Frequency Stability over Temperature Variations:

Temperature (°C)	Frequency Error (kHz)	Frequency Error (%)
+50	0.066000	0.000487
+40	0.073500	0.000542
+30	0.079500	0.000586
+20	0.082500	0.000608
+10	0.009300	0.000069
0	0.423015	0.003120
-10	0.032700	0.000241
-20	0.041700	0.000308

Frequency Stability over Voltage Variations:

DC Voltage	Voltage (V)	Temperature (°C)	Frequency Error (kHz)	Frequency Error (%)
Vmax	4.95	20	0.066000	0.000487
Vmin	3.825	20	0.073500	0.000542



Frequency Stability over Temperature Variations:

Temperature (°C)	Frequency Error (kHz)	Frequency Error (%)
+50	0.078000	0.000575
+40	0.078000	0.000575
+30	0.081000	0.000597
+20	0.085500	0.000631
+10	0.025800	0.000190
0	0.414615	0.003058
-10	0.028200	0.000208
-20	0.044700	0.000330

Frequency Stability over Voltage Variations:

DC Voltage	Voltage (V)	Temperature (°C)	Frequency Error (kHz)	Frequency Error (%)
Vmax	4.95	20	0.078000	0.000575
Vmin	3.825	20	0.078000	0.000575